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Exploring Bicycle Accessibility and Equity in Portland, Oregon

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Exploring Bicycle Accessibility and Equity in Portland, Oregon

Friday Transportation Seminar
January 12, 2018



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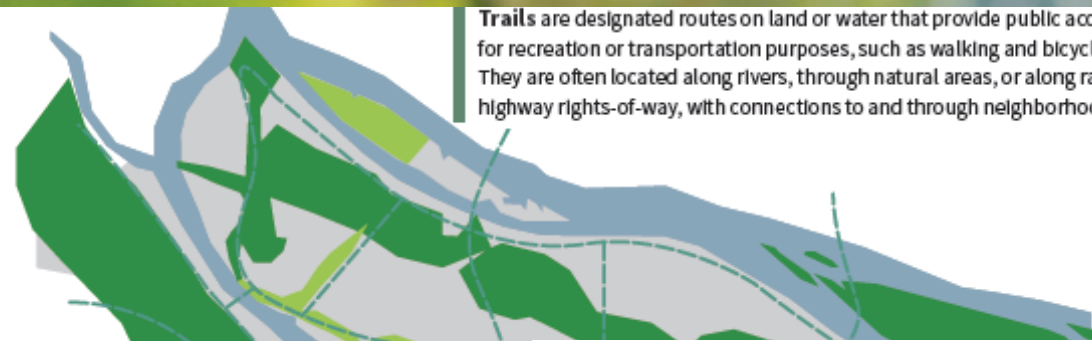


Portland State
UNIVERSITY

Portland “City Greenways”

- 2035 Comprehensive Plan
- Network of park-like pedestrian- and bicycle-friendly streets
- Roughly 3-mile intervals throughout city

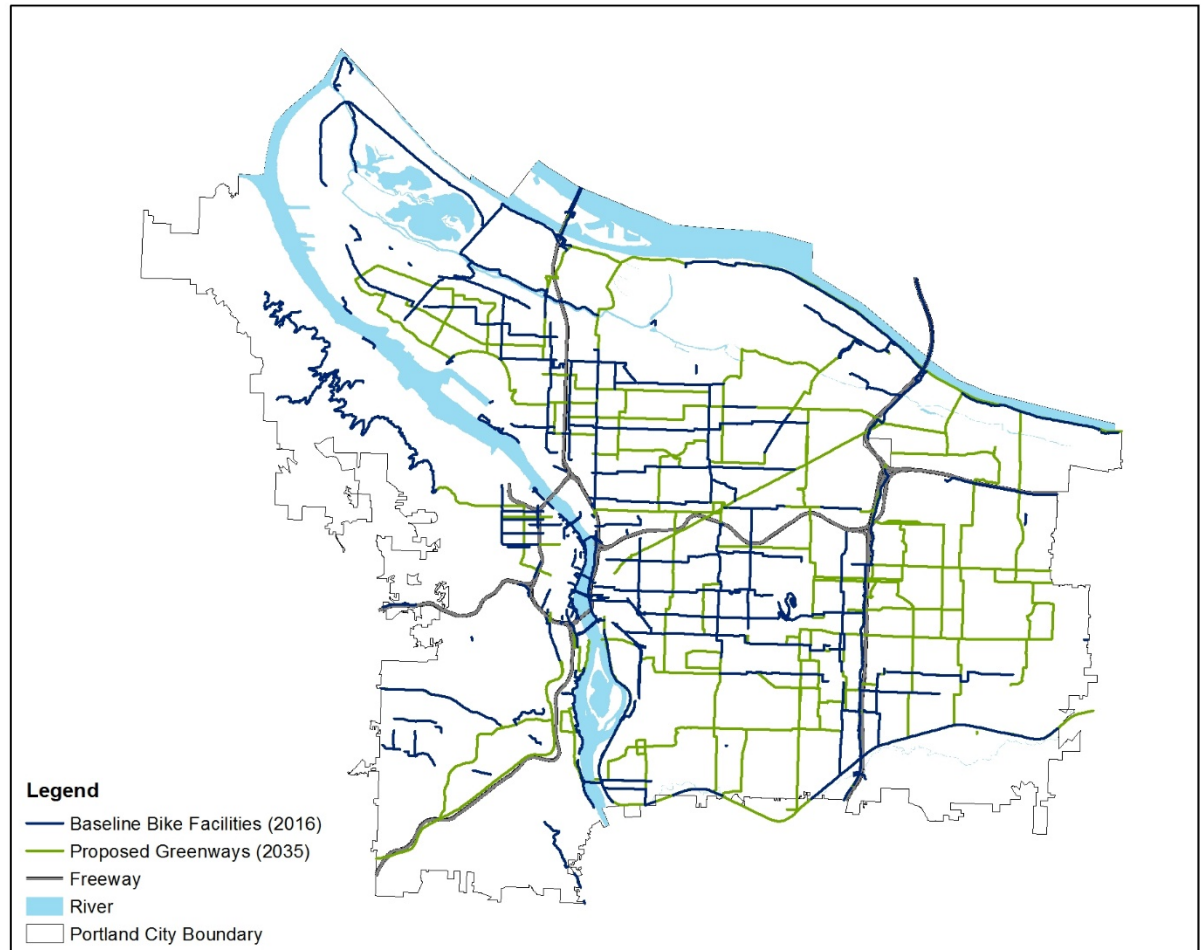
Trails are designated routes on land or water that provide public access for recreation or transportation purposes, such as walking and bicycling. They are often located along rivers, through natural areas, or along rail or highway rights-of-way, with connections to and through neighborhoods.



Enhanced greenway corridors are distinctive streets with extensive tree canopy and landscaped stormwater facilities that provide connections between major centers, schools, parks, natural areas and the rivers. Enhanced greenway corridors often involve improvements to existing streets, including wide planting strips and other features that provide space for large-canopy trees.

Heritage parkways are iconic streets or segments of streets with elements such as linear parkways, scenic views, and distinct landscaping or street design.

Neighborhood greenways are an extensive network of streets with low volumes of motor vehicle traffic. These routes are prioritized for bicycles and enhance the pedestrian environment, working in conjunction with the rest of the City Greenways system to extend the system into all neighborhoods.



Research Questions

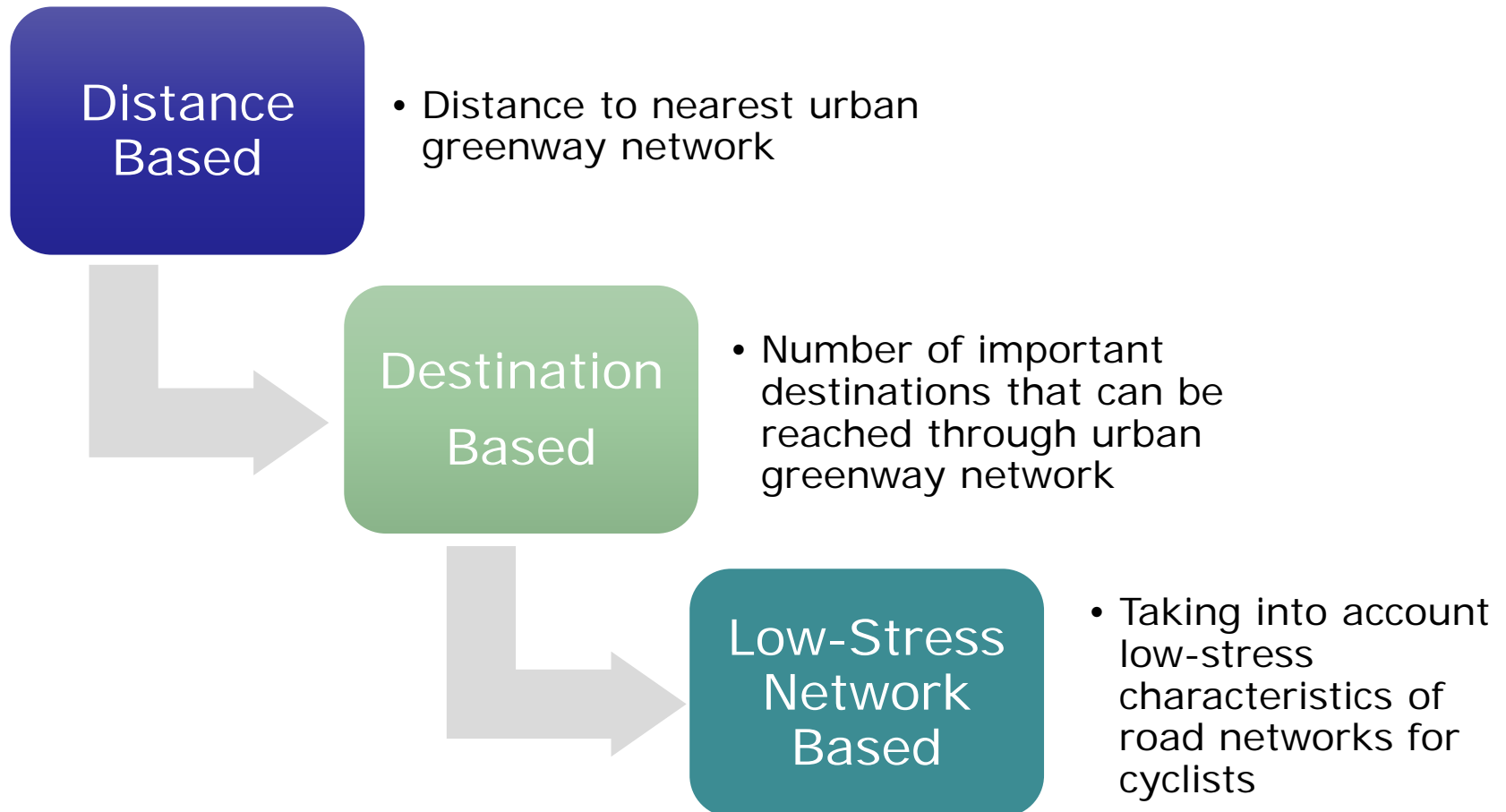
- How can we characterize and measure the urban greenway network?
- What are the equity outcomes of improving Portland's urban greenway network?

Bicycle Network Accessibility

- FHWA (2016) defines an active transportation network
 - To consist “of a series of interconnected facilities that allow non-motorized road users of all ages and abilities to safely and conveniently get where they need to go”
 - **Six Principles:** Cohesion, Directness, Accessibility, Alternative, Safety and Security, and Comfort

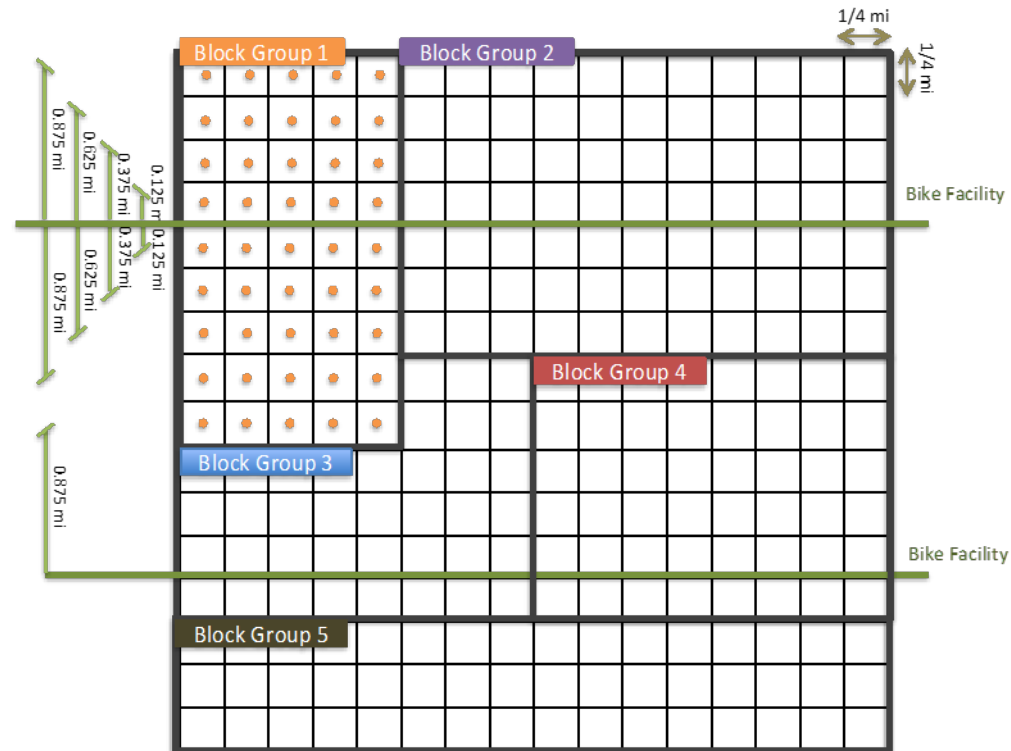
[Q1] How Can We Characterize and Measure the Urban Greenway Network?

Urban Greenway Network Measurement (**UGM**) Frameworks

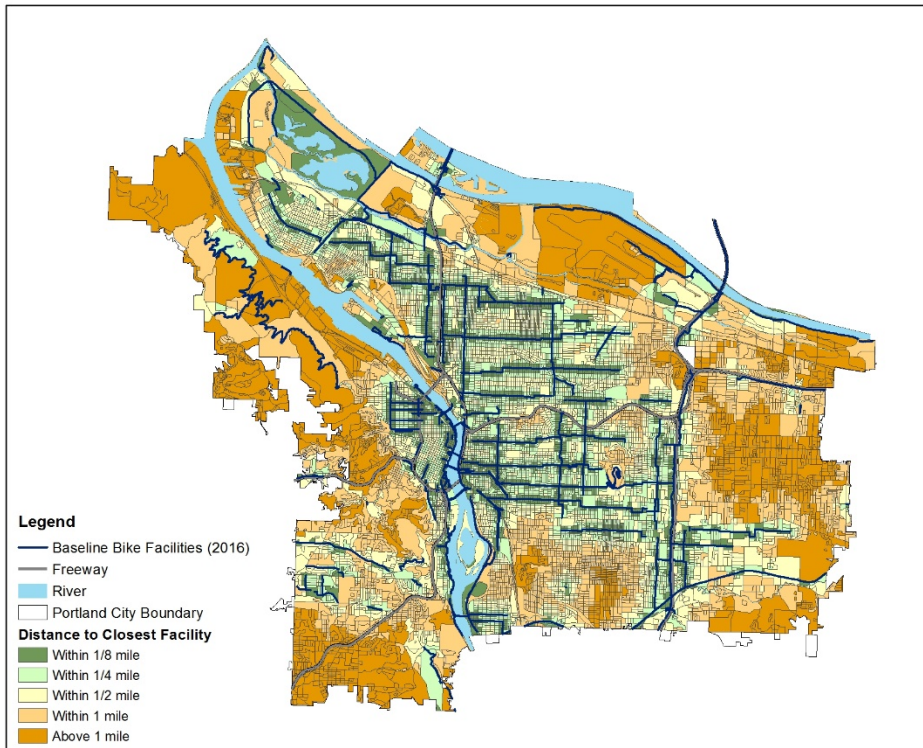


UGM – **Distance-Based**

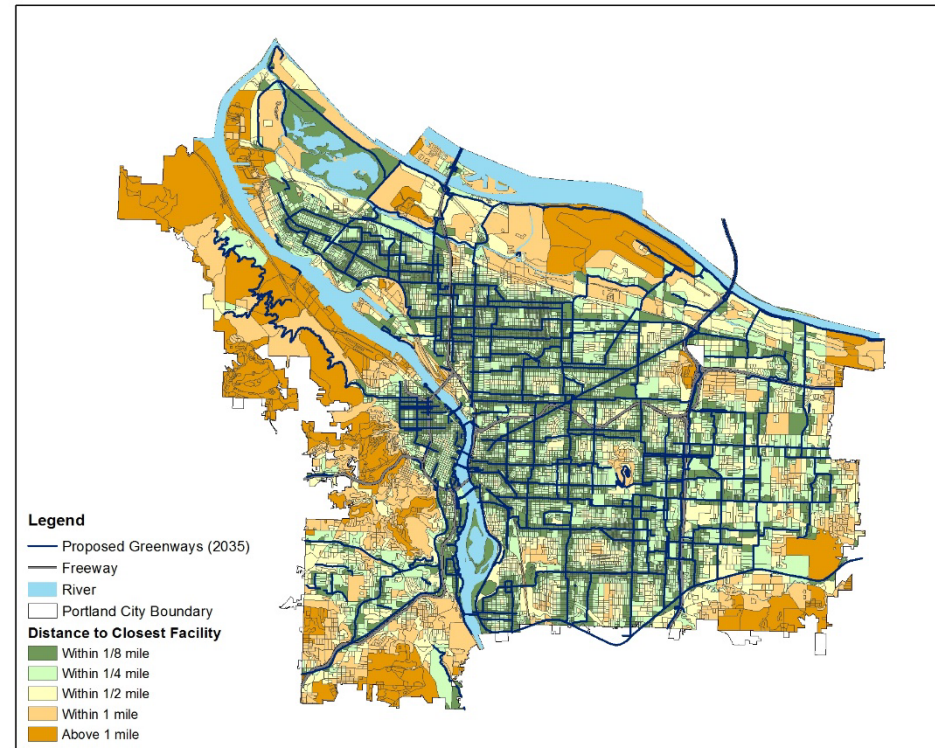
- Network distance to nearest bicycle infrastructure
- Calculated at Census Block level
→ aggregated to Census Block Group for equity analysis



UGM – Distance-Based



(a) Distance to Closest Bike Facilities (2016)



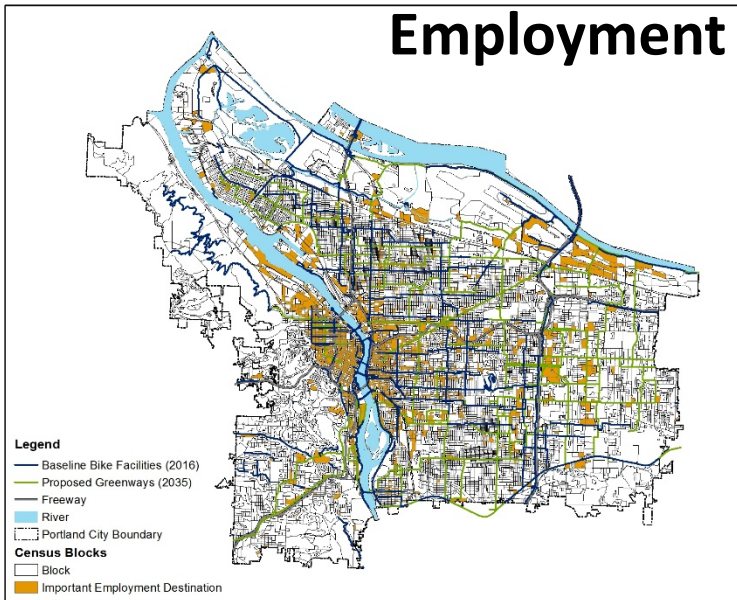
(b) Distance to Closest Bike Facilities (2035)

UGM – **Destination-Based**

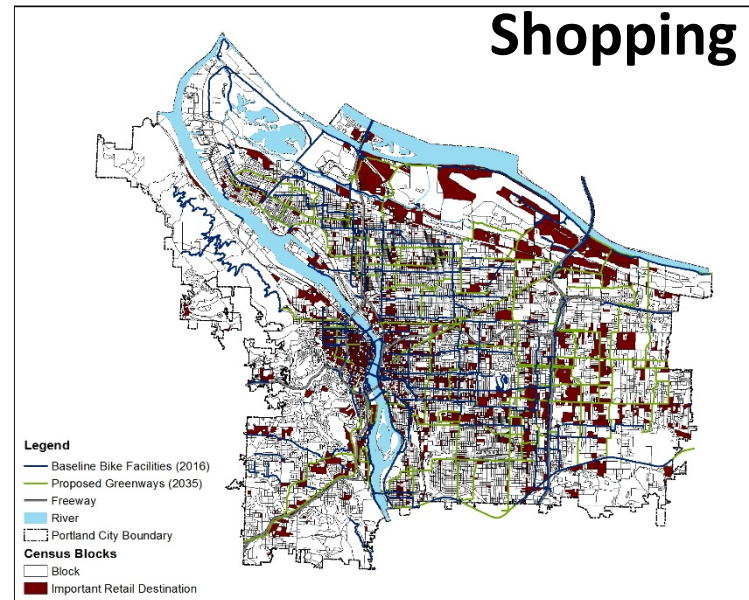
- Gravity-based opportunities measure
- Based on identified trip generators in literature
 - **Employment**
 - **Shopping**
 - **Services**
 - **Recreation**
- Typically weighted by number of jobs, retail sale volume or building square-footage
- Data source: LEHD 2014 & RLIS parks

Destinations

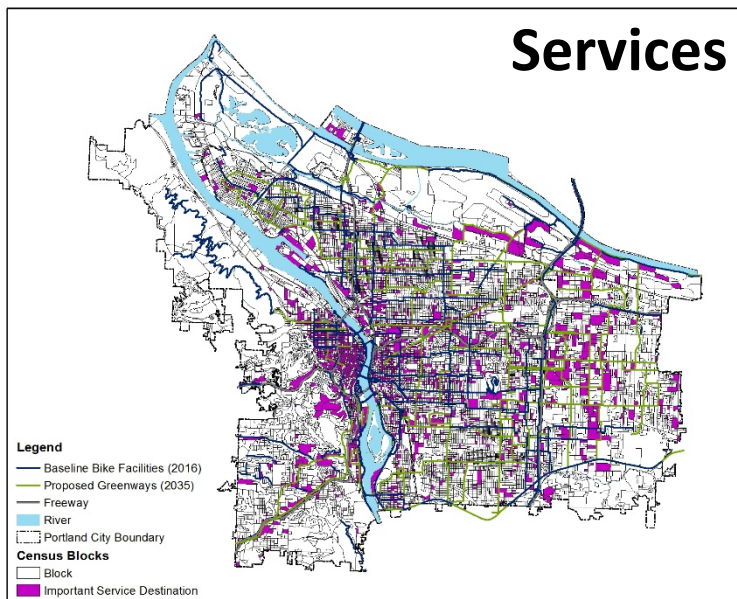
Employment



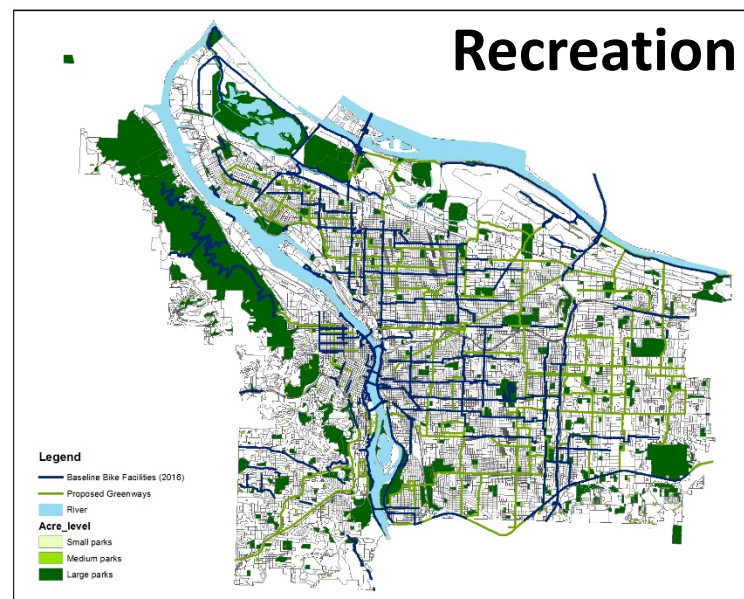
Shopping



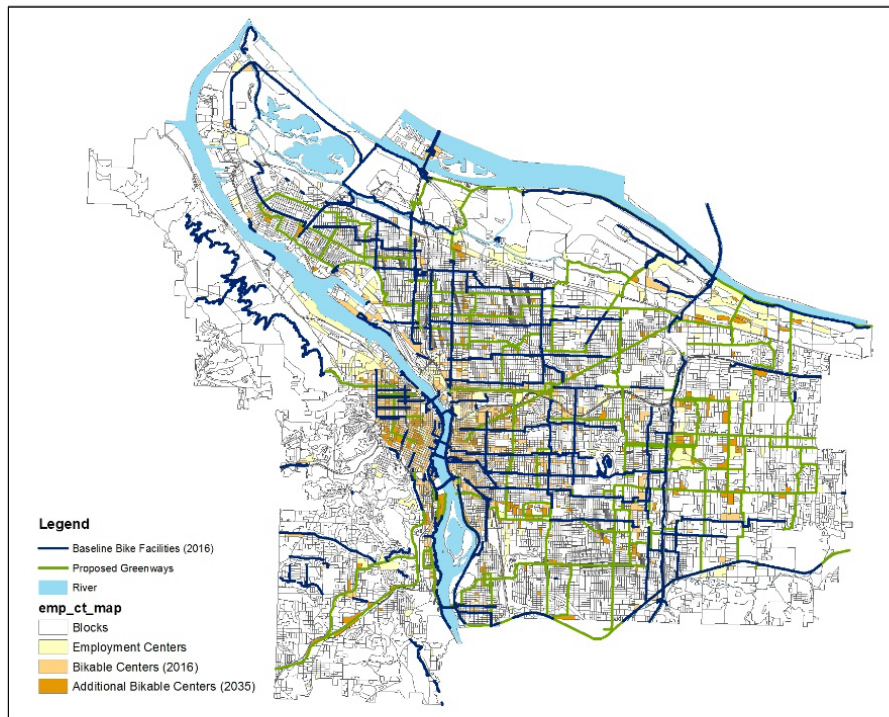
Services



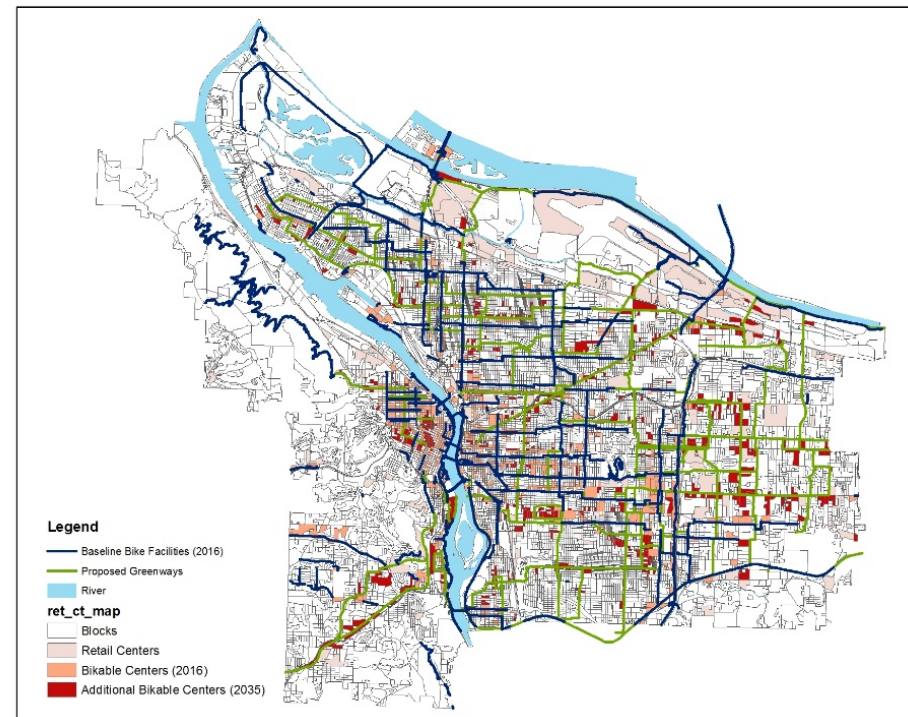
Recreation



UGM – Destination-Based

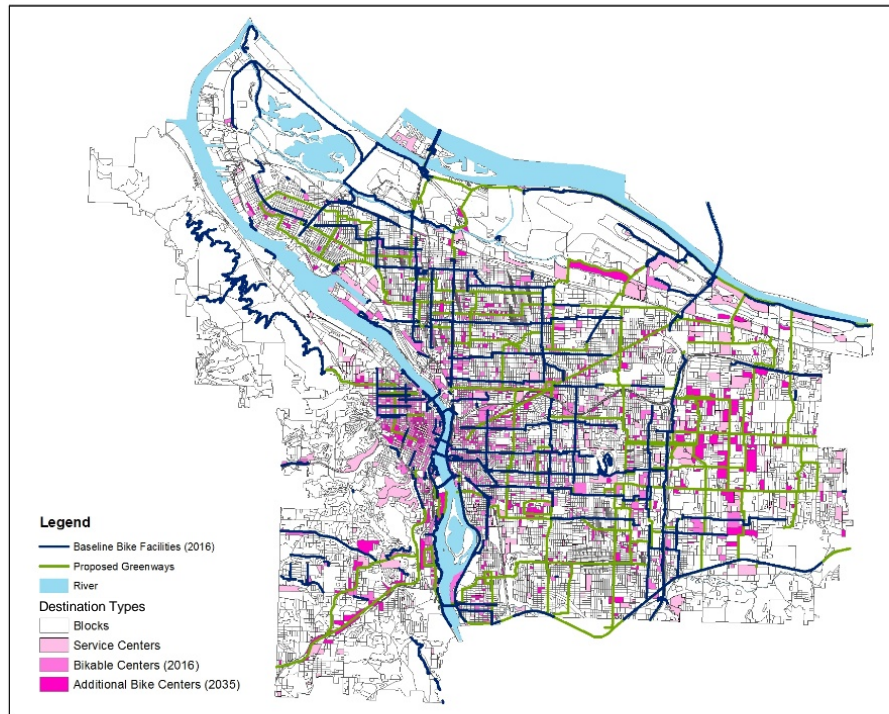


(a) Bike Catchment Employment Centers

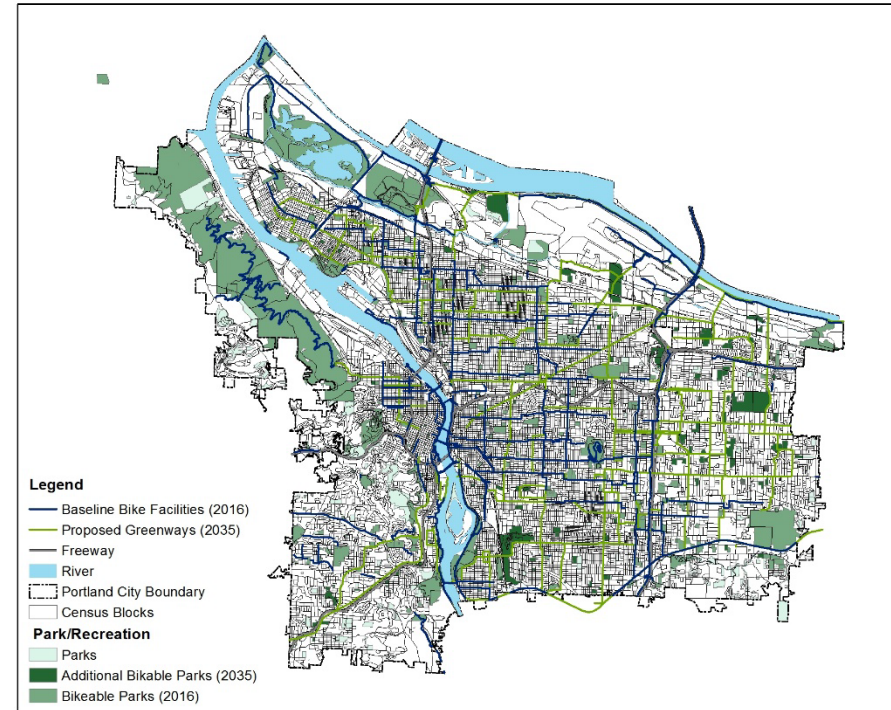


(b) Bike Catchment Retail Centers

UGM – Destination-Based



(c) Bike Catchment Service Centers



(d) Bike Catchment Park and Recreation Centers

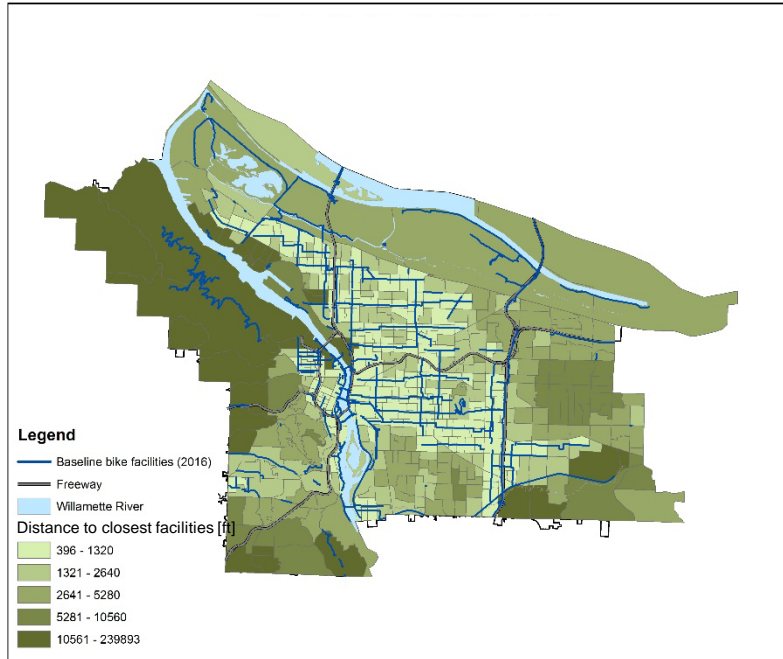
UGM – Destination-Based

Percent of Important Destinations Easily Reached by Urban Greenway Network

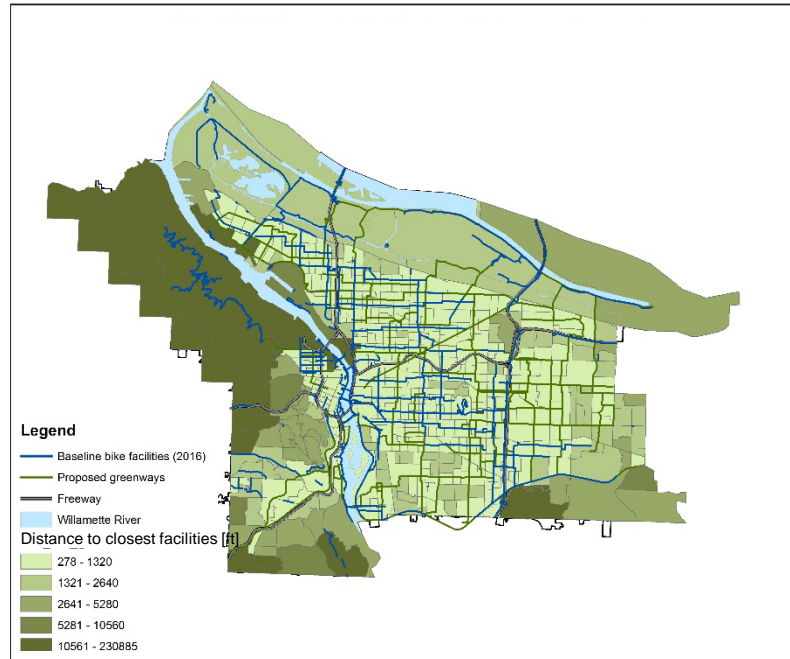
	Employment Centers	Retail Centers	Service Centers	Parks/ Recreation
Percent of Important Destinations				
2016 Scenario	62.3%	56.5%	59.4%	43.8%
2035 Scenario	87.1%	86.2%	87.0%	62.4%
Percent of Weighted Important Destinations				
2016 Scenario	56.7%	46.2%	47.9%	46.8%
2035 Scenario	79.6%	74.1%	66.7%	66.6%

[Q2] What are the Equity Outcomes of Improving the Urban Greenway Network?

Equity Impact – **Distance-Based UGM**

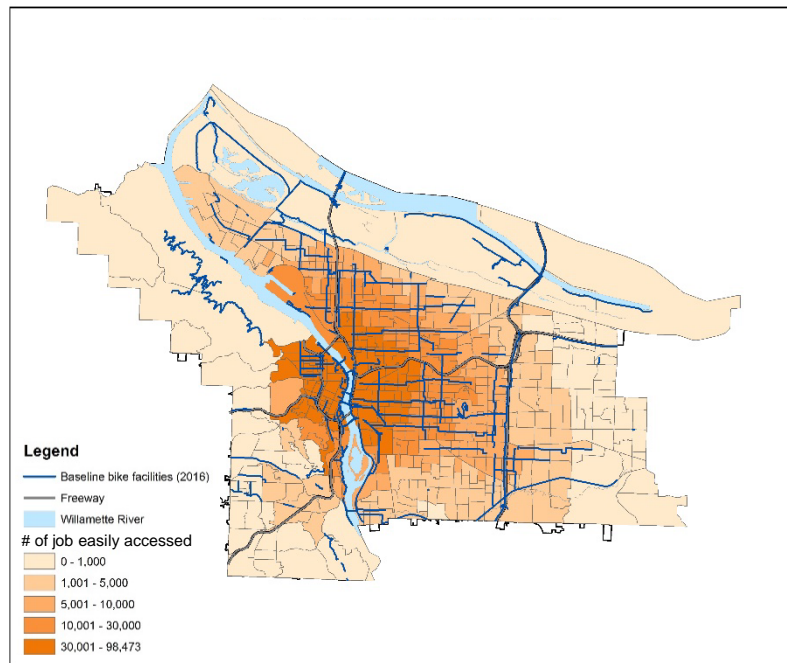


(a) Distance-Based UGM (2016)

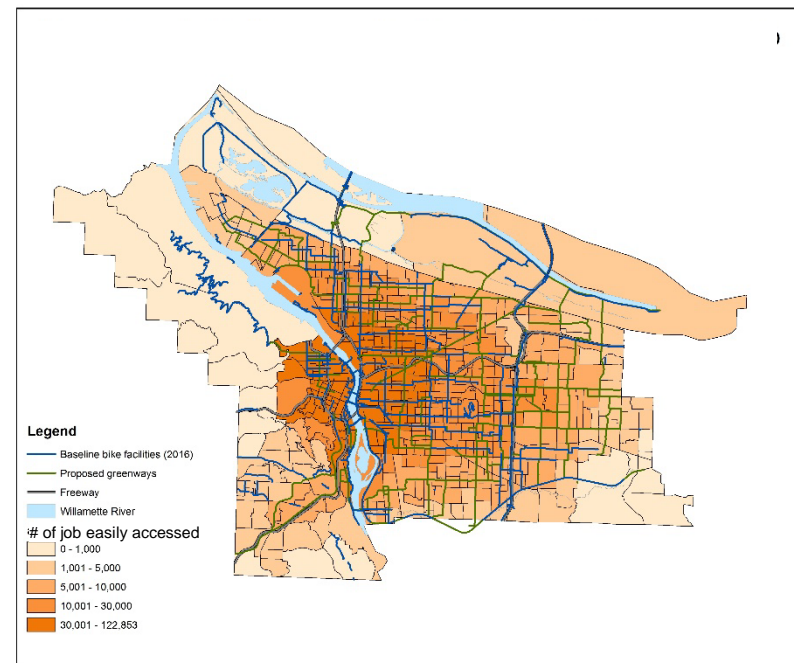


(b) Distance-Based UGM (2035)

Equity Impact – **Destinations-Based UGM**



(c) Destination-Based UGM (2016)



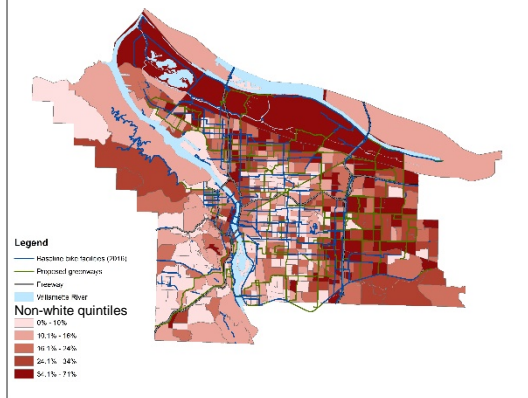
(d) Destination-Based UGM (2035)

Historically Marginalized Communities by Portland Metro Criteria

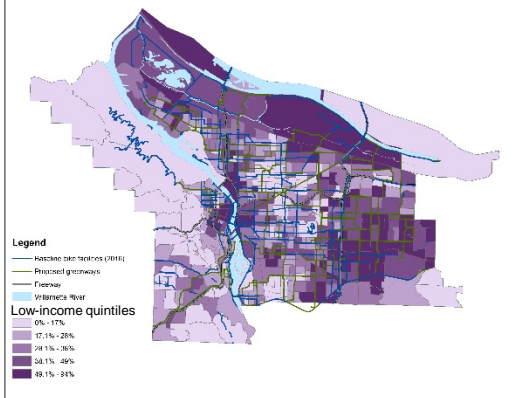
- 2018-2021 Metropolitan Transportation Improvement Plan
- Criteria:
 - **People of color**
 - **Low income**
 - **Limited English Proficiency**
 - **Older adults**
 - **Young persons**
- Defined at Census Tract level for Metro

Historically Marginalized Communities by Portland Metro Criteria

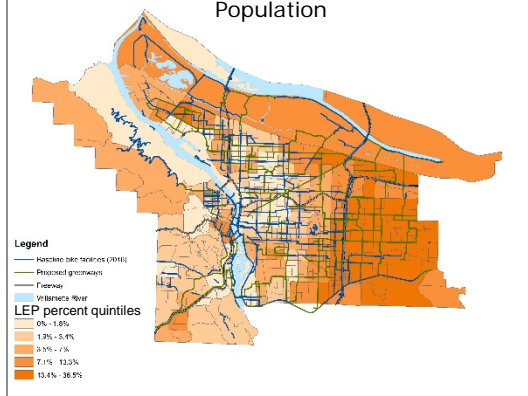
(a) Distribution of Non-white Population



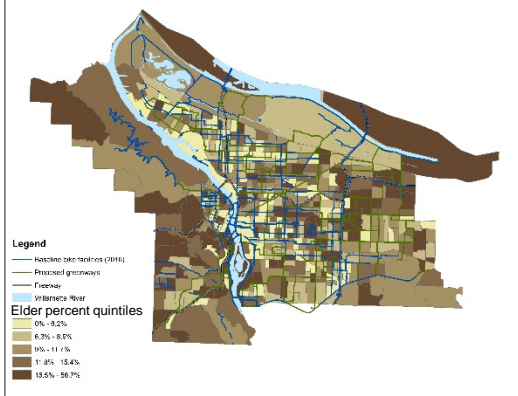
(b) Distribution of Low-income Population



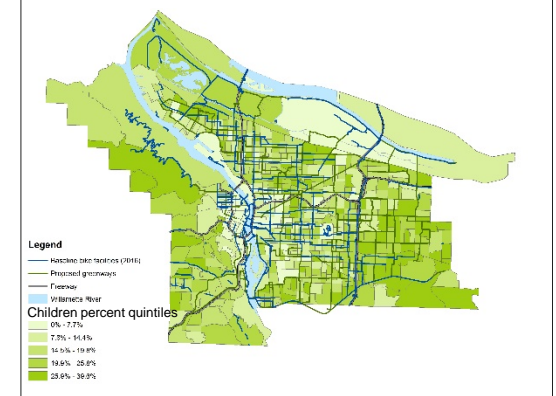
(c) Distribution of Limited English Proficiency Population



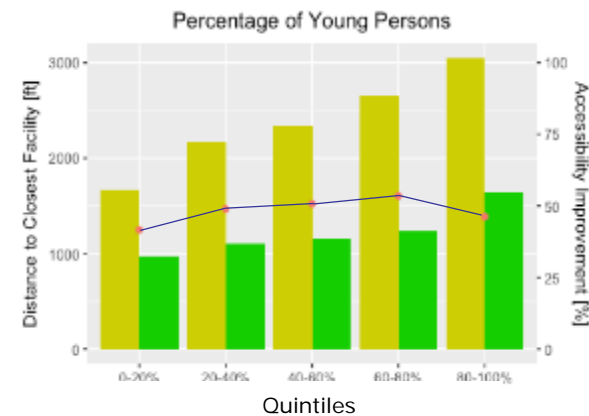
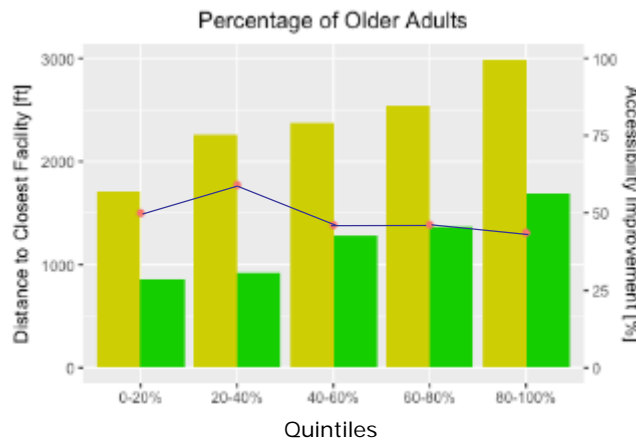
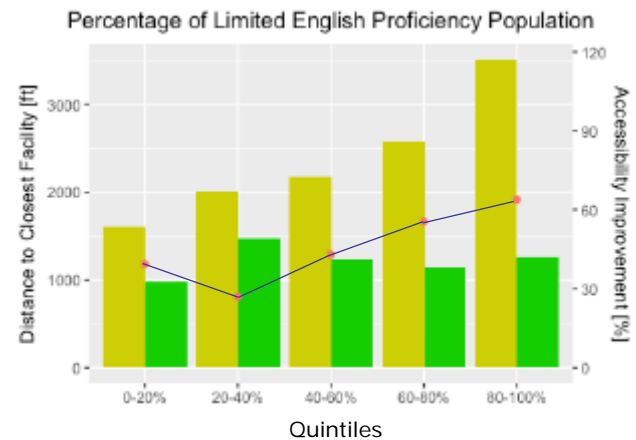
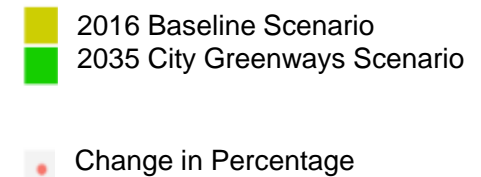
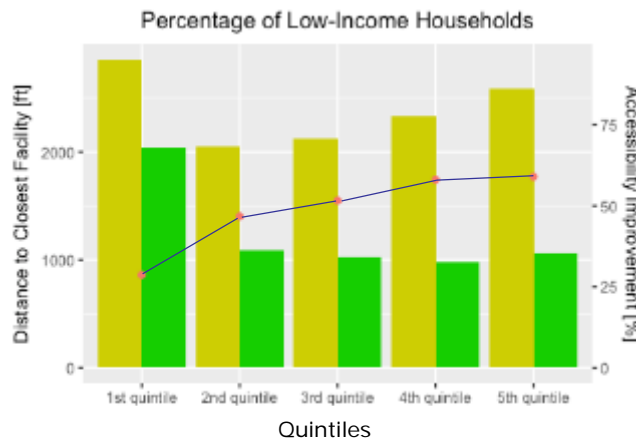
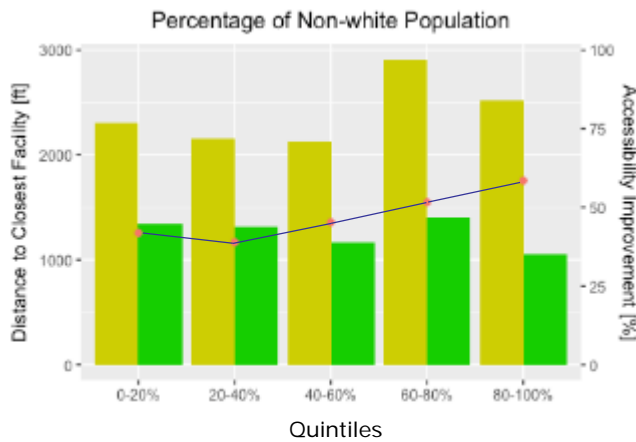
(d) Distribution of Older Adults



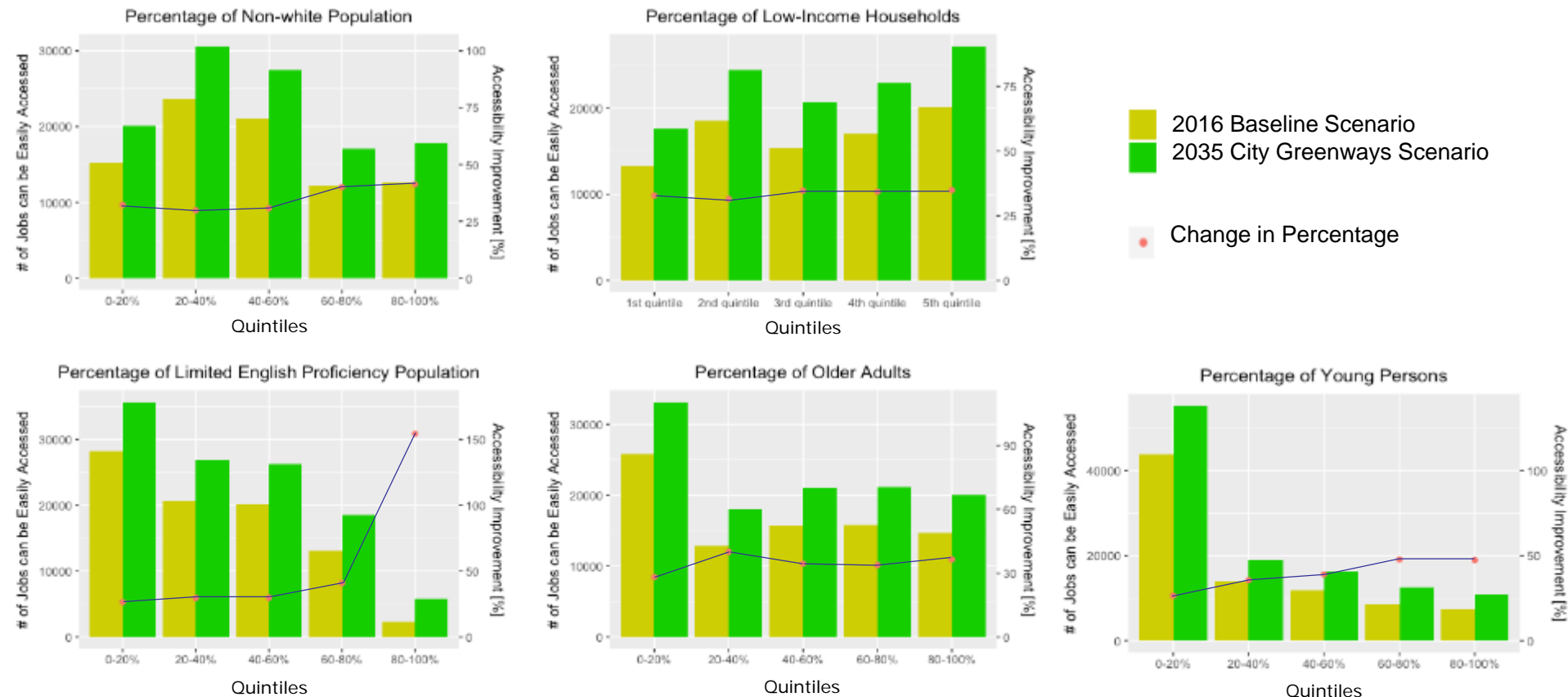
(e) Distribution of Young Persons



Equity Impact – Distance-Based UGM



Equity Impact – Destination-Based UGM



Conclusions and Limitations

- Bicycle accessibility measures that incorporate **destinations and opportunities** are important
- EJ indicator quintile analysis can better characterize accessibility improvements for the most disadvantaged groups of people
- Limits on static analysis

Continuing work...

- Bicycle accessibility measures that
 - **incorporate low-stress network concepts**
 - **incorporate both low-stress network concepts and destinations/opportunities**
- What is the best way to characterize and measure urban greenway networks in the context of economic development?

Thank you!

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